ESB Heavy Lift Requirements

Subject Area Logistics

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Operation Iraqi Freedom (OIF) has produced many examples that illustrate the abysmal heavy lift situation within USMC Engineer Support Battalions (ESBs). For example, in one instance during OIF I, Bridge Company C, 8th ESB crossed the Line of Departure in over thirty rented Kuwaiti trucks because there were not enough tactical vehicles available on which to load its heavy equipment and bridging components.[1] Additionally, the Marine Corps' most capable heavy-lift asset possesses a limited off-road capability and is unable to carry certain types of ESB equipment. For these reasons, the Marine Corps should add Heavy Equipment Transporters (HETs) or HET M1000 trailers to the Engineer Support Battalions' motor transport inventory in order to provide the battalions with the ability to move any piece of organic heavy equipment and mass the engineer effort anywhere on the battlefield.

The Problem

Marine Corps ESBs currently possess insufficient transportation assets to move their organic heavy equipment assets. One cause for this problem is that in the year 2000,

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the majority of Force Service Support Group (FSSG) transportation assets were consolidated into Transportation Support Battalions (TSBs).[2] This action left the ESBs almost completely dependent on the TSBs for heavy lift.

Although each ESB's Tables of Equipment (T/E) differs slightly, each ESB possesses approximately thirty-five to forty pieces of tracked equipment that require heavy lift. However, each battalion is only allocated approximately eight MK48/16/870 LVS configurations that are capable of hauling those pieces of equipment.[3] This equates to an organic ability to move approximately twenty-three percent of the battalion's heavy equipment that requires prime movers in one lift. When considering the additional fifty or so pieces of wheeled heavy equipment organic to each ESB that travel slowly or are unreliable on convoys, the lift capability is reduced to approximately nine percent. It is important to remember that these numbers are derived from T/E allocations and not real world on-hand numbers, and that they ignore the vehicles that are inducted into the maintenance cycle at any given time. These realities would undoubtedly cause the lift capability statistics to drop even further. Additionally, there are only four Logistics Vehicle Replacement Systems (LVRS) (fifth wheel variants that will replace the LVS MK48/16/870) planned for the Fiscal Year 2010 fielding.

Not only is the quantity of lift in the ESBs inadequate, but the MK48 Logistics Vehicle System (LVS) currently in use has "exceeded its life cycle and proved mechanically unreliable".[4] The 445-horsepower MK48 LVS power unit is capable of hauling fifty ton loads at speeds up to forty mph on improved roads.[5, 6, 7] However, due to a relatively small deck size and weight limit, the M870 trailers that are used for hauling heavy equipment cannot effectively transport large pieces of engineer equipment such as scrapers, twenty-five ton cranes, and D9 bulldozers. In a Marine Corps Systems Command Liaison Team Field Report from April of 2003, the trailers "were found to be too flimsy for hauling assets over long distances, especially when hauling over all-terrain…the tires and rims…routinely go flat and bend".[8] Clearly, the existing USMC heavy lift platform leaves much room for improvement.

The Solutions

The Heavy Equipment Transporter (HET) has been in use by the United States Army since 1993. It is a two part system that consists of the M1070 Truck Tractor manufactured by Oshkosh Truck Corporation and the M1000 Heavy Equipment Transporter semi-trailer manufactured by Systems & Electronics Inc.[9] This combination has proven to be exceptionally capable and reliable as a theater lift asset during Operation Iraqi Freedom.

The addition of HETs would give the ESBs the capability to lift organic equipment that cannot be moved on the existing M870 trailers. The large deck size will accommodate the scraper and twenty-five ton crane with ease. The seven hundred horsepower HET is capable of hauling loads from seventy to seventy-two tons at speeds up to forty-five mph on paved roads, forty mph on secondary roads, and fifteen mph cross country.[10, 11] This is twenty tons more than the MK 48/16/870 weight-limit and has earned the HET the distinction in Iraq of being the only tactical vehicle that is capable of moving the sixty-three ton Caterpillar D-9 bulldozers currently in use by engineer units in theater.[12]

M1000 HET trailers are far superior to the M870 trailer in terms of maneuverability, durability, and ease of maintenance. The M1000 has completely automatic, multi-axle steering, giving it superior maneuverability in restricted areas despite its size. The five axles and forty tires of the M1000 offer significantly more load bearing capacity, cross-country travel ability, and redundancy than the three axles and twelve tires found on the M870 trailer.[13,14] In fact, this “suspension allows for limited operation with one disabled axle raised, redundant steering and suspension provide for fail-safe operation” and “dual-line redundant hydraulics preclude failure due to hose rupture.” Additionally, the M1000 offers greater ease of

operator maintenance than the M870. A tire change can be executed “by one person without removing payload within 30 minutes” and the axles even rotate for access to the inside tires. Finally, the trailer deck height has a ten inch adjustment range which “provides running gear maintenance access.”[15]

Due to their large deck size and enormous weight bearing capacity, HETs are capable of carrying much more equipment than any truck in the current Marine Corps inventory. For example, while the MK48/16/870 can only lift one D-7 bulldozer at a time, one HET can easily carry two D-7s.[16,17] This ability to carry more equipment on each truck reduces the overall truck requirement for each convoy. Taking this logic one step further, fewer trucks on the road means fewer Marines exposed to the dangers of enemy action and accidents. Additionally, smaller convoys facilitate the convoy commander’s command and control. Although the HET has much to offer in terms of capabilities and tactical impact, there is a significantly less-expensive alternative that should also be considered.

Because most of the benefits of the HET system are due to the capabilities of the M1000 trailer, the M1000 trailer offers another solution to the Marine Corps’ transportation problem. Since the M1000 is compatible with the MK48/16 LVS power unit with fifth wheel adapter, procuring the trailer alone and

combining it with the existing system could offer a solution to the ESBs' transportation deficiencies.[18] A drawback to this combination is that it would be significantly less powerful (by approximately 255 horsepower) than the HET system and would share the vulnerabilities of the "mechanically unreliable" LVS power unit.[19] In fact, this course of action was pursued in the early 1990's but was later abandoned due to problems with the M1000's steering performance and probably in part due to a shift in focus towards Operations Desert Shield/Desert Storm.[20]

The drawbacks of combining the M1000 with the LVS could be addressed during the development of the Logistics Vehicle Replacement System (LVRS), which is a current Marine Corps Systems Command (MARCORSYSCOM) project. The LVRS is rumored to be significantly more powerful than the LVS and, as a new system, should offer significantly improved reliability. If the requirement to haul the M1000 trailer with loads up to seventy-two tons is identified early enough in the development process, it could potentially be incorporated into the LVRS. Since the M1000 is compatible with the MK48/16 currently in use, ensuring compatibility with the LVRS should not present any significant problems. The option of combining the M1000 with the LVRS could potentially provide a good balance between cost and capability by capitalizing on money already spent on the current LVRS program and the existing M1000 technology.

Proposed Distribution

Regardless of which suggested solution is chosen, each ESB should own eight complete systems complete with operators and maintainers. This would allow each battalion to transport sixteen D-7 bulldozer equivalents in one lift, twice the current battalion organic capability. For each battalion, the Table of Equipment should reflect two systems in each letter company, with the remaining systems located in Support Company for internal use or for distribution to other companies as needed.

Including the Marine Corps Reserve's 6th Engineer Support Battalion, thirty-two complete systems are proposed for the initial fielding plan. At $300,000 per unit, this would put the initial cost at approximately $9.6 million for the M1000 trailer alone.[21] On the other end of the spectrum, thirty-two HET systems would cost approximately $19 million.[22] Of course, not all of the systems need to be fielded at once and the cost could be spread out over several years if necessary. Although it is an expensive proposition, one must be careful not to ignore the potential long-term savings associated with this proposal. Dedicating the M870 trailer to light-medium lift only would likely cause a significant reduction in maintenance costs for that platform. Additionally, the added ability to carry any piece of organic Marine Corps equipment would reduce outsourced transportation costs.

It is critical that the chosen system be kept within the Engineer Support Battalions for several reasons. Maintaining a robust organic lift capability in the ESBs would increase their ability to mass the engineer effort when required in order to better support the Marine Air Ground Task Force (MAGTF). Also, placing the systems directly into the ESBs would increase operator proficiency by allowing them to train regularly with the cumbersome loads that are inherent to that type of unit. The operators would also become familiar with the ESB tactics, techniques and procedures for various operations. Finally, by adding the chosen heavy-lift system to the ESBs, not only could each battalion increase its lift capability, but a domino effect would make other vehicles available for other missions. For example, the existing M870 trailers could be used for moving smaller pieces of heavy equipment, utilities gear, bridging components, or Class IV construction materials. This in turn would make more Medium Tactical Vehicle Replacements (MTVRs) available for troops and cargo. These by-products of procuring a dedicated ESB heavy-lift asset would significantly reduce the ESBs' demand for support from Transportation Support Battalion (TSB), and would consequently allow TSB to better support the rest of the MAGTF.

The HET and Expeditionary Warfare

One argument against adding the HET to the ESB motor transport inventory is that it is counter to the Marine Corps' expeditionary nature because as an organization we need to "travel light" and reduce our logistical footprint as much as possible. While a small logistical footprint is desirable, not being able to move mission essential equipment around the battlefield is contrary to the Marine Corps' expeditionary nature. As long as the mission of the USMC ESB requires it to employ large pieces of heavy equipment throughout the battlefield, the ESB must also possess the organic ability to move that gear to the required locations.

Some also argue that the HET takes up too much space on ship and is therefore difficult to transport into theater. Although it does require more square footage to transport on ship than the MK48/16/870, that cost is mitigated by the fact that it is not a one-for-one replacement because fewer HETs are required to provide the same capability. Additionally, although the HET is a large piece of equipment, it is still C-5A and C-17 air transportable.[23]

Conclusion

There is little question that something must be done to improve the ESB's ability to lift their organic equipment across the battlefield in sufficient quantity to mass the engineer effort. The best way to do this is to take advantage of the

existing HET and/or M1000 technology. These arguments are illustrated by the ESB's inability to move significant quantities of its equipment and the superiority of the HETs when compared to the existing heavy-lift platform. Additionally, there are significant potential benefits to be realized by keeping a robust organic lift capability within the ESBs vice forcing them to compete for the limited TSB assets that are in high demand from the rest of the FSSG. Although purchasing HETs or M1000s would be costly, the ultimate gains in efficiency, reduced maintenance costs, and increased Engineer Support Battalion capability would be well worth the money spent.

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